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Date _____
Algebra

Two Way Frequency Tables

1.	Tacos	Pizza	Total
Male	5	6	11
Female	7	9	16
Total	12	15	27

Data will vary depending on class

Find all of the joint probabilities in the table. ^{inside}
 $P(\text{male} \cap \text{tacos})$ $P(\text{male} \cap \text{pizza})$ $P(\text{female} \cap \text{tacos})$ $P(\text{female} \cap \text{pizza})$

$$\frac{5}{27} \qquad \frac{6}{27} \qquad \frac{7}{27} \qquad \frac{9}{27}$$

Find all of the marginal probabilities in the table. ^{outside}
 $P(\text{male})$ $P(\text{female})$ $P(\text{tacos})$ $P(\text{pizza})$

$$\frac{11}{27} \qquad \frac{16}{27} \qquad \frac{12}{27} \qquad \frac{15}{27}$$

Find all of the conditional probabilities in the table. ^{inside}
 $P(\text{male} / \text{tacos})$ $P(\text{female} / \text{tacos})$ $P(\text{male} / \text{pizza})$ $P(\text{female} / \text{pizza})$

$$\frac{5}{12} \qquad \frac{7}{12} \qquad \frac{6}{15} \qquad \frac{9}{15}$$

$P(\text{tacos} / \text{male})$ $P(\text{pizza} / \text{male})$ $P(\text{tacos} / \text{female})$ $P(\text{pizza} / \text{female})$

$$\frac{5}{11} \qquad \frac{6}{11} \qquad \frac{7}{16} \qquad \frac{9}{16}$$

2.	Sports	No Sports	Total
Music	5	8	13
No Music	9	3	12
Total	14	11	25

What is the probability that a student chosen at random:

Plays music and sports

$$\frac{5}{25}$$

Plays music but not sports

$$\frac{8}{25}$$

inside
total total

Plays sports but not music

$$\frac{9}{25}$$

Does not play sports or music

$$\frac{3}{25}$$

Plays sports

$$\frac{14}{25}$$

Does not play sports

$$\frac{11}{25}$$

outside
total total

Plays music

$$\frac{13}{25}$$

Does not play music

$$\frac{12}{25}$$

What is the probability that a student who plays music:

Plays sports

$$\frac{5}{13}$$

Does not play sports

$$\frac{8}{13}$$

What is the probability that a student who does not play music:

Plays sports

$$\frac{9}{12}$$

Does not play ~~music~~ sports

$$\frac{3}{12}$$

inside
outside

What is the probability that a student who plays sports:

Plays music

$$\frac{5}{14}$$

Does not play music

$$\frac{9}{14}$$

What is the probability that a student who does not play sports:

Plays music

$$\frac{8}{11}$$

Does not play music

$$\frac{3}{11}$$

One-hundred employees of a company were asked their opinion on paying high salaries to the CEO. Their responses are summarized in the following contingency table.

	In Favor	Against	
Male	15	45	60
Female	4	36	40
	19	81	100

3. Find each of the joint probabilities.

P(male and in favor)

$$\frac{15}{100}$$

P(female and in favor)

$$\frac{4}{100}$$

inside
total total

P(male and against)

$$\frac{45}{100}$$

P(female and against)

$$\frac{36}{100}$$

4. Find each of the marginal probabilities.

P(male)

$$\frac{60}{100}$$

P(in favor)

$$\frac{19}{100}$$

outside
total total

P(female)

$$\frac{40}{100}$$

P(against)

$$\frac{81}{100}$$

5. Find each of the conditional probabilities:

P(male/in favor)

$$\frac{15}{19}$$

P(male/against)

$$\frac{45}{81}$$

inside
outside

P(in favor/male)

$$\frac{15}{60}$$

P(against/male)

$$\frac{45}{60}$$

P(female/in favor)

$$\frac{4}{19}$$

P(female/against)

$$\frac{36}{81}$$

P(in favor/female)

$$\frac{4}{40}$$

P(against/female)

$$\frac{36}{40}$$

13. A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama	
Male	70	35	105
Female	48	42	90
	118	77	195

What is the probability that a student is male and prefers comedy?

$$\frac{70}{195}$$

What is the probability that a male student would prefer comedy?

$$\frac{70}{105}$$

What is the probability that a student is male?

$$\frac{105}{195}$$

What is the probability that a student is female given that they like drama?

$$\frac{42}{77}$$

14. A public opinion poll was taken to explore the relationship between age and support for a candidate in an election. The results of the poll are summarized in the table below.

Age	For	Against	No Opinion	
21-40	30	12	8	50
41-60	20	40	15	75
Over 60	25	35	15	75
	75	87	38	200

What is the probability that someone has no opinion?

$$\frac{38}{200}$$

What is the probability that someone is over 60 and against?

$$\frac{35}{200}$$

What is the probability that someone is for the candidate given that they are between 21-40?

$$\frac{30}{50}$$

15. The set of data in the table below shows the results of a survey on the number of messages that people of different ages text on their cell phones each month.

Age Group	Text Messages per Month			
	0-10	11-50	Over 50	
15-18	4	37	68	109
19-22	6	25	87	118
23-60	25	47	157	229
	35	109	312	456

What is the probability that someone texts 0-10 messages per month?

$$\frac{35}{456}$$

What is the probability someone texts over 50 messages per month and are 23-60?

$$\frac{157}{456}$$

What is the probability that someone texts over 50 messages per month given that the person is between the ages of 23 and 60?

$$\frac{157}{229}$$

16. A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

	Hip-Hop	Alternative	Classic Rock	
Middle School	28	18	4	50
High School	22	22	6	50
College	16	20	14	50
	66	60	24	150

What percentage of college students prefer classic rock?

Condition $\frac{14}{50} = .28(100) = 28\%$

What percentage of the students that prefer classic rock are college students?

Condition $\frac{14}{24} = 58.\bar{3}\%$